

Appl. No. 09/783,000  
Audi. dated January 26, 2004

REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested in view of the above identified amendments and the following remarks.

The Examiner has rejected claim 2 under 35 U.S.C. 112 first paragraph. The Examiner has requested that the paragraph describing Fig. 3 be amended to clarify its meaning. This paragraph has been amended to clarify its meaning. Therefore, the applicant believes that claim 2 as amended is now patentable.

The Examiner has also rejected claims 1 and 21-25 as being unpatentable over U.S. Patent No. 4,232,399 to Heiter, U.S. Patent no. 6,622,013 to Miyoshi et al with a view to U.S. Patent No. 3,593,147. to Gurak.

The applicant believes that claim 1 as amended is patentable over the above identified references.



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having a low pass filter to limit its speed of shifting of the phase shifter.

For example, with *Heiter*, The Examiner asserts on page 3, that *Heiter* would disclose "...a phase controller having its output coupled to the phase shifter (two phase shifters), the controller having circuits to limit the speed of shifting of the phase shifter ...". In the cited reference (figure 5, column 5, line 52 to column 6, line 67) however, no statement can be found in this reference that would justify this assertion for the following reason:

Instead of a single, continuously adjustable phase shifter as it is disclosed in the present invention, *Heiter* obtains a continuously variable phase shift by means of two variable phase shifters (20,21), located in two separate, switchable wave paths (18,19). The phase shifter (20) is variable over, at least, the range between zero and 180 degrees. The second phase shifter (21) is variable over, at least, the range between 180 degrees and 360 degrees (see Abstract). This is in order to solve "the return-toward-zero problem" (see column 2, lines 1 to 46) which can be solved in different ways as it is described for example in

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claim 16 of the present invention. As a result of the application of two phase shifters, Heiter as stated in column 6 lines 33-36 has the problem of switching in the overlap region of phase ranges between these two phase shifters which he solves by the means that "...the controller activates the appropriate hysteresis counter which provides an override signal, thus extending the voltage ramps applied to the corresponding phase shifters". The applicant believes that the hysteresis counter can in no way be understood as a voluntary means to create a phase controller having a low pass filter to limit its speed of shifting of the phase shifter. There is no indication at all for a relationship between a retarding effect on the control circuit by means of the hysteresis. A hysteresis of this kind is obsolete if only one phase shifter is applied as in the present invention.

In contrast therewith, a teaching is presented in the description of the present invention which refers to the special problems occurring as a result of driving "through the Rayleigh wave reception field". For this reason according to the present invention "...the speed of the phase control must be " adjusted so that no audible, disturbing frequency swing can occur within the trapping or operating range of the phase control circuit.

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The description teaches further that "...in reception situations where beams of waves with different transit times superimpose each other.... such superimposition lead to disturbing frequency swings...." (See paragraph 18 of published application) It is further said that "...in conjunction with rapid phase control, a signal disturbed in the first path would impress its interference, by the control process on the second signal path and thus forcefully cause such interference in the combined signal as well...", "...and on the other hand the phase control must not be limited so that when driving through the Rayleigh wave reception...." the system can follow the changes of the phases of the antenna signals. "Time constants in the order of 1 to 20ms are useful for this purpose". Much of this discussion can be found in paragraph 22 of the published application which also starts on page 11 line 6 of the originally filed application.

In addition, Gurak and Heiter also restrict the teachings of their diversity systems to combine two signals of the same frequency. The above described problems of the combination of different instantaneous frequencies due to the erroneous frequency swings of the received signals do not arise in the scenario where their systems are applied. Therefore, these

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systems are described as ideal and without failure wherein anyone skilled in the art does not need an enhancement with respect to the problems described above.

Thus, with respect to the systems of Gurak and Heiter, there is neither a hint for the necessity of a distortion detector nor a hint for a "phase shifter having a controller having a low pass filter to limit its speed of shifting of said phase shifter" as stated in claim 1. Therefore, the applicant believes that claim 1 and claims 21-25 are patentable over the above identified references. In addition, the applicant believes that new claim 26 is also patentable over the above identified references. New claim 26 is substantially similar to claim 1, however new claim 26 includes the statement that the speed of the phase control must be limited so that "...no audible disturbing frequency swing can occur within the operating range of the phase control circuit" which was also recited in paragraph 22 of the printed application.

In particular, new claim 26 includes the elements of claim 25 and it also includes the recitation that the speed of the phase control must be adjusted so that "no audible, disturbing

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frequency swing can occur within the trapping or operating range of the phase control circuit..."

Thus, since this feature is not disclosed in any of the above references, the applicant believes that claim 26 is patentable as well.

In addition, the Examiner cites the reference to Myoshi. Myoshi teaches that an interference detector does not teach a phase controller having a low pass filter to limit the speed of shifting of the phase shifter.

Myoshi claims that it receives excellent reception conditions by using a simple selection method by composing a variety of antenna sets which form a predetermined radiation pattern (as shown in column 2, lines 31-33). However, it is obvious that a high number of antenna sets would be necessary to create a sufficient number of different antenna patterns to cover a total azimuth in steps for the application on a vehicle. Thus, there is no control unit to select an appropriate signal from these antenna sets. Thus, in this case, the signal selector searches at random in steps for an appropriate signal.

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In contrast, with the present invention there is a continuous adaptation of the system to maximize the actual signal of co-phasing. Thus, it is obvious that the method of the present invention is much more efficient than the high number of antenna signals being obtained by switching between the various antenna sets of Myoshi.

In addition Myoshi teaches in column 5, lines 49-58 that

"In the reception apparatus of the present invention, the antenna set selector has a preliminary selector that selects the antenna set based upon the quality of the frame of the received signal, a selected information storage that stores the selected antenna set, and a combining demodulator that combines received signals from directional antennas belonging to the antenna set stored in the selected information storage section to demodulate in receiving a next frame after the frame"

In contrast, with the present invention, the diversity system is designed for a digital modulated signal structured by frames suffering in a different way from distortions than the frequency modulated broadcast signals which are analog signals. Thus, for this reason, the applicant believes that it cannot be seen how the Examiner arrived at a phase controller continuously controlling the phase and having a low pass filter to limit its



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speed of shifting the phase shifter based upon the prior art. Therefore, the applicant believes that the remaining claims are patentable over the above cited references.

In addition, the applicant believes that it would not be obvious to enhance the combining techniques of Gurak with the selection methods of Miyoshi.

For example, none of the references teach a phase controller having a low pass filter to limit its speed of shifting of the phase shifter. This feature is important for use with automobiles.

In addition, while Miyoshi claims to receive excellent reception conditions with a simple selection method by composing a variety of antenna sets forming a predetermined radiation pattern. However, with Gurak, as stated in column 1 lines 31-42, the "signal selection" technique did not provide as much advantage as compared to pre-detection combining techniques since both of these channels contribute to the combined IF signal output resulting in an advantage in long distance scatter-type communication systems.

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Therefore, the applicant believes that one of ordinary skill in the art at the time learns from Gurak that selection methods are inferior to combining techniques as described in Miyoshi, forming a barrier for the thinking that both adverse techniques could be combined by any means in an advantageous form.

In addition, one of ordinary skill in the art at the time does not learn anything from the references that could be used to design a system for application on motor vehicles and solving special problems occurring as a result of driving "through the Rayleigh wave reception field" in combination with the Frequency modulated broadcast FM signals. Therefore, there is no suggestion or motivation to be derived from Gurak and Miyoshi to implement a phase shifter with extended range under a continuous speed adjustment.

Furthermore, one of ordinary skill in the art had a very large number of diversity systems to consider. Since there was no suggestion for the combination of any particular diversity systems, the applicant believes that it would not be possible to design an effective and efficient diversity system for automotive application for FM broadcast reception. Thus, to arrive at the

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design of the present invention as in claim 1, would only be possible by guessing to enhance the combining techniques of Gurak which are then modified with the selection methods of Miyoshi would even then fail to have a phase controller having a low pass filter to limit its speed of shifting of the phase shifter.

In summary, claims 1-25 have been amended. Claims 26 and 27 have been added. Because the number of claims for the above application exceeds 20, the commissioner is hereby authorized to charge Collard & Roe, P.C.'s deposit account of 03-2468 the amount of \$36.00 for two claims for a large entity. The commissioner is hereby authorized to charge any additional fee to the above identified deposit account as well.

In view of the foregoing, it is respectfully requested that the claims be allowed and that this case be passed to issue.

The Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

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